

CLAIMS

1. A device for generating a random sequence of bits (10), comprising an oscillating means having an input terminal (409) for receiving a bias as input, **characterized** in that the oscillating means (13) comprises at least one oscillator amplifier (400a, 400b, 400c) and a differential amplifier (500) connected to said oscillator amplifier, each oscillator amplifier (400a, 400b, 400c) and the differential amplifier (500) comprise an amplifying means (303a, 303b; 403a, 403b) protected from interfering signals by means of a load (301a, 301b, 302a, 302b; 401a, 401b, 402a, 402b) connected to said amplifying means and supply, and a tail current source (304a, 304b; 404a, 404b) connected to said amplifying means and grounding means.

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2. The device according to claim 1, wherein the number of oscillator amplifiers (400a, 400b, 400c) is odd, said amplifiers are connected in series.

20 3. The device according to claim 1 or 2, wherein the amplifying means comprises a common-source amplifier (303a, 303b; 403a, 403b).

25 4. The device according to claim 3, wherein the common source amplifier comprises transistors (303a, 303b; 403a, 403b) having a differential topology.

5. The device according to any of the previous claims, wherein the load comprises cascoded transistors (301a, 301b, 302a, 302b; 401a, 401b, 402a, 402b) connected to the amplifying means (303a, 303b; 403a, 403b).

35 6. The device according to any of the claims 1-4, wherein the load comprises resistors connected to the amplifying means (303a, 303b; 403a, 403b).

7. The device according to any of the previous claims, wherein the tail-current source (304a, 304b; 404a, 404b) is connected to the amplifying means (303a, 303b; 403a, 403b) and grounding means to provide common-mode feedback.

8. The device according to any of the claims 1-5 or 7, wherein the load (301a, 301b, 302a, 302b; 401a, 401b, 402a, 402b), the amplifying means (303a, 303b; 403a, 403b) and the tail-current source (304a, 304b; 404a, 404b) comprise MOS (Metal Oxide Semiconductor) transistors.

9. The device according to any of the claims 1-5 or 7, wherein the load (301a, 301b, 302a, 302b; 401a, 401b, 402a, 402b), the amplifying means (303a, 303b; 403a, 403b) and the tail-current source (304a, 304b; 404a, 404b) comprise BJT (Bipolar Junction Transistors) transistors.

10. The device according to any of the claims 1-5 or 7-8, wherein the load (301a, 301b, 302a, 302b; 401a, 401b, 402a, 402b) comprises PMOS transistors and the amplifying means (303a, 303b; 403a, 403b) and the tail-current source (304a, 304b; 404a, 404b) comprise NMOS transistors.

11. The device according to any of the claims 1-5 or 7-8, wherein the load (301a, 301b, 302a, 302b; 401a, 401b, 402a, 402b) comprises NMOS transistors and the amplifying means (303a, 303b; 403a, 403b) and the tail-current source (304a, 304b; 404a, 404b) comprise PMOS transistors.

12. The device according to claim 10 or 11, wherein the width-over-length ratio (Z) of the transistors (303a, 303b; 403a, 403b) of the amplifying means is at least 3 times the width-over-length ratio of the transistors of the

tail-current source (304a, 304b; 404a, 404b), and the width-over-length ratio of a second transistor pair (302a, 302b; 402a, 402b) of the load is at least 3 times the size of the width-over-length ratio of a first transistor pair
5 (301a, 301b; 401a, 401b) of the load.

13. The device according to claim 12, wherein the width (W) of the transistors (303a, 303b; 403a, 403b) of the amplifying means and the transistors of the second
10 transistor pair (302a, 302b; 402a, 402b) is in the range of 2,5-125 μm , and the length (L) of said transistors is in the range of 0,25-12,5 μm ; the width (W) and the length (L), respectively, of the transistors (304a, 304b; 404a, 404b) of the tail-current sources and the transistors of
15 the first transistor pair (301a, 301b; 401a, 401b) of the load are in the range of 0,25-12,5 μm .

14. The device according to any of the claims 1-13,
20 wherein the device is a voltage controlled oscillator (VCO), the input terminal (409) is connected to a noise source (11).

15. The device according to any of the claims 1-13,
25 wherein the device is a current controlled oscillator (CCO), the input terminal (409) is connected to a noise source (11).

16. The device according to any of the claims 1-15,
30 wherein the input terminal (409) for receiving a bias input is connected to a device for generating a noise signal, comprising a noise source (11) for generating intrinsic noise, said noise source comprises an noisy amplifier cell (100) having an amplifying means (103a, 103b), a load
35 (101a, 101b, 102a, 102b) connected to said amplifying means

and supply, and a tail-current source (104a, 104b) connected to grounding means and to the amplifying means (103a, 103b).

5 17. An electronic apparatus (1) comprising a device (10) for generating a random sequence according to any of the claims 1-15.

10 18. The electronic apparatus according to claim 17, wherein the device is a mobile radio terminal, a pager, a communicator, an electronic organizer or a smartphone.

15 19. The electronic apparatus according to claim 17, wherein the electronic apparatus is a mobile telephone (1).

 20. An integrated circuit comprising a device (10) for generating a random sequence according to any of the claims 1-16.